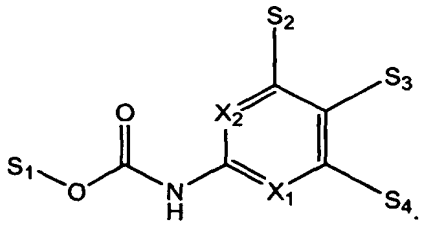
What is claimed is:

1. A method of inhibiting bacterial growth comprising contacting a bacterium with an effective amount of one or more compounds having the structure:



wherein

(a) X_1 and X_2 are CH or N, and at least one of X_1 and X_2 are N;

(b) S_1 is an organic radical comprising 1 to 8 carbon atoms;

(c) S_2, S_3, and S_4 are independently selected from hydrogen, amino, halogen, or one or more organic radicals comprising 1 to 26 carbon atoms;

(d) or a salt thereof.

2. The method of claim 1, wherein the bacterium is antibiotic resistant.

3. The method of claim 1, wherein the bacterium is gram positive.

4. The method of claim 3, wherein the gram positive bacterium is selected from the group consisting of: *M. tuberculosis, M. bovis, M. typhimurium, M. bovis* strain BCG, BCG substrains, *M. avium, M. intracellulare, M. africanum, M. kansasii, M. marinum, M. ulcerans, M. avium* subspecies *paratuberculosis, Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus equi, Streptococcus pyogenes, Streptococcus agalactiae, Listeria monocytogenes, Listeria ivanovii, Bacillus anthracis, B. subtilis, Nocardia asteroides*, and other *Nocardia* species, *Streptococcus viridans*

group, *Peptococcus* species, *Peptostreptococcus* species, *Actinomyces israelii* and other *Actinomyces* species, and *Propionibacterium acnes*.

5. The method of claim 1, wherein the bacterium is gram negative.

6. The method of claim 5, wherein the gram negative bacterium is selected from the group consisting of: *Clostridium tetani, Clostridium perfringens, Clostridium botulinum,* other *Clostridium* species, *Pseudomonas aeruginosa,* other *Pseudomonas* species, *Campylobacter* species, *Vibrio cholerae, Ehrlichia* species, *Actinobacillus pleuropneumoniae, Pasteurella haemolytica, Pasteurella multocida,* other *Pasteurella species, Legionella pneumophila*, other *Legionella* species, *Salmonella typhi,* other *Salmonella* species, *Shigella* species *Brucella abortus,* other *Brucella* species, *Chlamydi trachomatis, Chlamydia psittaci, Coxiella burnetti, Escherichia coli, Neiserria meningitidis, Neiserria gonorrhea, Haemophilus influenzae, Haemophilus ducreyi,* other *Hemophilus species, Yersinia pestis, Yersinia enterolitica,* other *Yersinia species, Escherichia coli, E. hirae* and other *Escherichia* species, as well as other *Enterobacteria, Brucella abortus* and other *Brucella* species, *Burkholderia cepacia, Burkholderia pseudomallei, Francisella tularensis, Bacteroides fragilis, Fudobascterium nucleatum, Provetella* species, and *Cowdria ruminantium.*

7. The method of claim 5, wherein the compound is used in conjunction with a permeability enhancer, wherein the permeability enhancer allows the compound to cross the cell envelope of the bacterium.

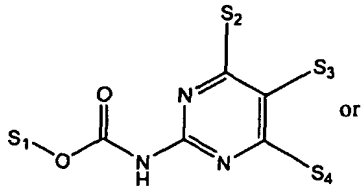
8. The method of claim 7, wherein the permeability enhancer is selected from the group consisting of polymyxin B, surface active agents, defensins, other membrane active peptides and chelating agents.

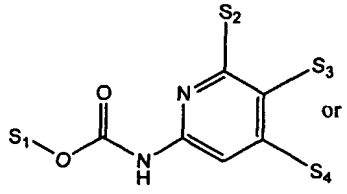
9. The method of claim 1, further comprising contacting the bacterium with a permeability enhancer.

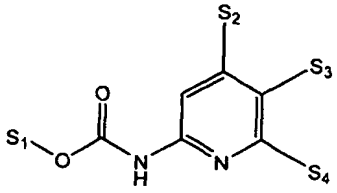
10. The method of claim 9, wherein the permeability enhancer is selected from the group consisting of polymyxin B, surface active agents, defensins, other membrane active peptides and chelating agents.

11. The method of claim 1, wherein the compound has a molecular weight of less than about 500 grams per mole.

12. The method of claim 1, wherein the compound has the structure:



or


or


wherein

a) S_1 is an alkyl group comprising 1 to 4 carbon atoms;

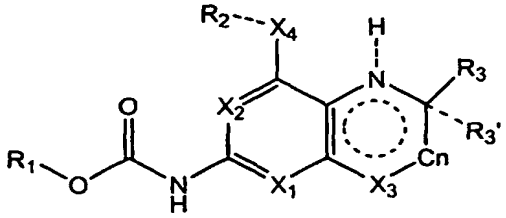
b) S_2 is a halogen, amino, hydroxy, or an organic radical comprising 1 to 26 carbon atoms selected from alkyl, alkoxy, monosubstituted amino, or disubstituted amino;

c) S_2 and S_3

(i) are independent substituents that can be independently selected from a halogen, amino, hydroxy, or an organic radical comprising 1-26 carbon atoms, or

(ii) together form a heteroaryl or heterocyclic radical comprising 5, 6, or 7 ring atoms, optionally substituted with 1, 2, or three ring substituents selected from halogen, amino, or organic radicals comprising 1 to 12 carbon atoms.

13. The method of claim 1, wherein the compound has the structure:



wherein

a) X_1 and X_2, are CH or N, and at least one of X_1 and X_2 are N;

b) X_3 is CH, N, NH, O, or S,

c) X_4 is a halogen, oxygen, sulfur, or phosphorus atom, amino, NH, or an organic radical comprising 1-26 carbon atoms,

d) R_1 is an alkyl radical comprising 1 to 4 carbon atoms,

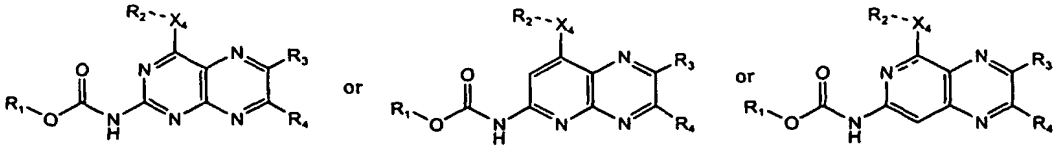
e) R_2 is an optional radical selected from hydrogen, amino, halogen, or one or more organic radicals comprising 1 to 26 carbon atoms,

f) R_3 and an optional R_3' radical that may be present or absent are independently selected from hydrogen, halogen, or an organic radical comprising 1 to 26 carbon atoms,

g) Cn comprises one or two optional ring carbon atoms, wherein each optional ring carbon atom has one or two substituent radicals independently selected from hydrogen, halogen, hydroxy, amino, or an organic radical comprising 1 to 26 carbon atoms,

or a pharmaceutically acceptable salt thereof.

14. The method of claim 1, wherein the compound has the structure:



wherein

a) R_1 is an alkyl group comprising 1 to 4 carbon atoms,

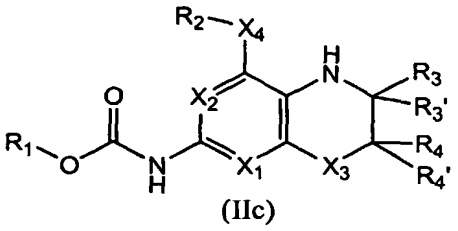
b) R_2--X_4 is an amino or a mono-substituted amino radical comprising 1 to 26 carbon atoms,

c) R_3 and R_4 are independently selected from hydrogen, halogen, or an organic radical comprising 1 to 12 carbon atoms,

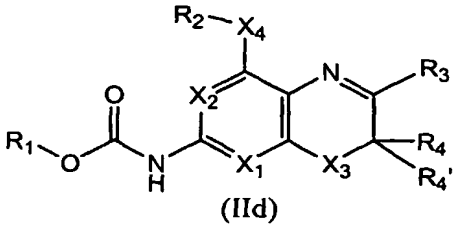
or a pharmaceutically acceptable salt thereof.

15. The method of claim 15, wherein R_3 and R_4 are independently selected from hydrogen, alkyl or alkoxy radicals comprising 1 to 18 carbon atoms, aryl radicals comprising 6 to 18 carbons, or heteroaryl radicals comprising 1 to 18 ring carbons.

16. The method of claim 1, wherein the compound has the structure:



(IIc)



(IId)

wherein

a) X_1 and X_2, are CH or N, and at least one of X_1 and X_2 are N;

b) X_3 is CH, N, NH, O, or S,

c) X_4 is a halogen, oxygen, sulfur, or phosphorus atom, amino, NH, or an organic radical comprising 1-26 carbon atoms,

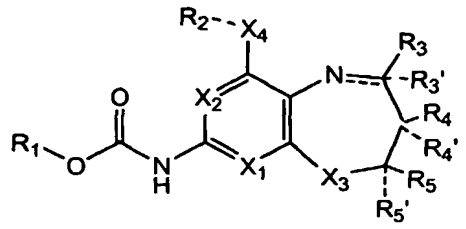
d) R_1 is an alkyl radical comprising 1 to 4 carbon atoms;

e) R_2 is selected from hydrogen, amino, halogen, or one or more organic radicals comprising 1 to 26 carbon atoms.

f) R_3, R_4, R_3', R_4', radicals are independently selected from hydrogen, halogen, or an organic radical comprising 1 to 26 carbon atoms

or a pharmaceutically acceptable salt thereof.

17. The method of claim 1, wherein the compound has the structure:



wherein

a) X_1 and X_2, are CH or N, and at least one of X_1 and X_2 are N;

b) X_3 is CH, N, NH, O, or S,

c) X_4 is a halogen, oxygen, sulfur, or phosphorus atom, amino, NH, or an organic radical comprising 1-26 carbon atoms,

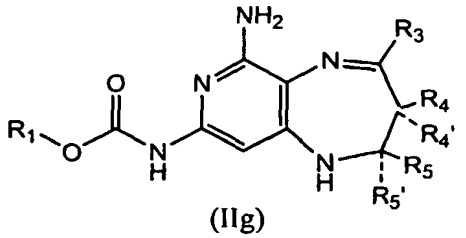
d) R_1 is an alkyl radical comprising 1 to 4 carbon atoms;

e) R_2 is an optional radical selected from hydrogen, amino, halogen, or one or more organic radicals comprising 1 to 26 carbon atoms.

f) R_3, R_4, R_5, and the optional R_3', R_4', and R_5'radicals are independently selected from hydrogen, halogen, or an organic radical comprising 1 to 26 carbon atoms,

or a pharmaceutically acceptable salt thereof.

18. The method of claim 1, wherein the compound has the structure:



(IIg)

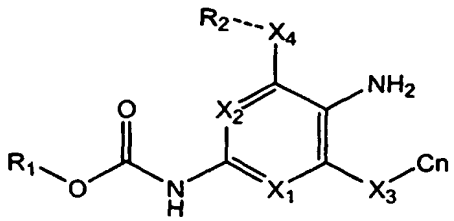
wherein

a) R_1 is an alkyl radical comprising 1 to 4 carbon atoms;

b) the R_3, R_4, R_5, R_4', and R_5'radicals are independently selected from hydrogen, halogen, or an organic radical comprising 1 to 26 carbon atoms,

or a pharmaceutically acceptable salt thereof.

19. The method of claim 1, wherein the compound has the structure:



a) X_1 and X_2, are CH or N, and at least one of X_1 and X_2 are N;

b) X_3 is CH, N, NH, O, or S,

c) X_4 is a halogen, oxygen, sulfur, or phosphorus atom, amino, NH, or an organic radical comprising 1-26 carbon atoms,

d) R_1 is an alkyl radical comprising 1 to 4 carbon atoms;

e) R_2 is an optional radical selected from hydrogen, amino, halogen, or one or more organic radicals comprising 1 to 26 carbon atoms.

f) Cn is hydrogen, or an organic radical comprising 1 to 26 carbon atoms,

or a pharmaceutically acceptable salt thereof.

20. The method of claim 1, wherein the compound has the formula:

a) [5,6-Diamino-4-(2-hydroxy-1-methyl-3-phenoxypropylamino)-pyridin-2-yl]-carbamic acid ethyl ester;

b) [8-(4-Diethylamino-1-methyl-butylamino)-2,3-diphenyl-pyrido[2,3-b]pyrazin-6-yl]-carbamic acid ethyl ester;

c) (1-Amino-8-phenyl-6,7-dihydro-5H-2,5,9-triazabenzocyclohepten-3-yl)-carbamic acid ethyl ester;

d) [2,3-Diphenyl-8-(4-sulfamoyl-benzylamino)-pyrido[2,3-b]pyrazin-6-yl]-carbamic acid ethyl ester;

e) (5-Amino-3-butyl-2-methyl-1,2-dihydro-pyrido[3,4-b]pyrazin-7-yl)-carbamic acid ethyl ester;

f) (5-Amino-2,3-diphenyl-2H-pyrido[4,3-b][1,4]oxazin-7-yl)-carbamic acid ethyl ester;

g) (5-Ethoxy-2,3-diphenyl-pyrido[3,4-b]pyrazin-7-yl)-carbamic acid ethyl ester;

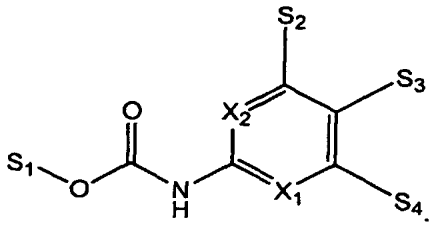
h) (5-Amino-2,3-diphenyl-pyrido[3,4-b]pyrazin-7-yl)-carbamic acid ethyl ester;

i) (5-Amino-3-{[(4-methoxy-phenyl)-methyl-amino]-methyl}-1,2-dihydro-pyrido[3,4-b]pyrazin-7-yl)-carbamic acid ethyl ester; or

j) [5-Amino-3-(4-butylcarbamoyloxy-phenyl)-2-methyl-1,2-dihydro-pyrido[3,4-b]pyrazin-7-yl]-carbamic acid ethyl ester;

or a pharmaceutically acceptable salt thereof.

21. A method of killing a bacterium comprising contacting the bacterium with an effective amount of one or more compounds having the structure



wherein

a) X_1 and X_2 are CH or N, and at least one of X_1 and X_2 are N;

b) S_1 is an organic radical comprising 1 to 8 carbon atoms;

c) S_2, S_3, and S_4 are independently selected from hydrogen, amino, halogen, or one or more organic radicals comprising 1 to 26 carbon atoms;

d) or a salt thereof.

22. The method of claim 21, wherein the bacterial infection is a gram positive bacterial infection.

23. The method of claim 22, wherein the bacterial infection is selected from the group consisting of: : *M. tuberculosis, M. bovis, M. typhimurium, M. bovis* strain BCG, BCG substrains, *M. avium, M. intracellulare, M. africanum, M. kansasii, M. marinum, M. ulcerans, M. avium* subspecies *paratuberculosis, Staphylococcus aureus, Staphylococcus epidermidis,*

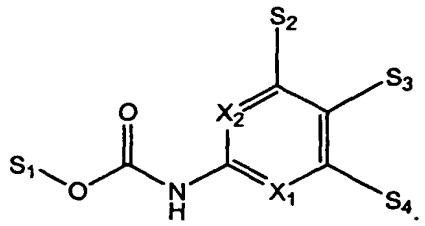
Staphylococcus equi, Streptococcus pyogenes, Streptococcus agalactiae, Listeria monocytogenes, Listeria ivanovii, Bacillus anthracis, B. subtilis, Nocardia asteroides, and other *Nocardia* species, *Streptococcus viridans* group, *Peptococcus* species, *Peptostreptococcus* species, *Actinomyces israelii* and other *Actinomyces* species, and *Propionibacterium acnes*.

24. The method of claim 21, wherein the bacterial infection is a gram negative bacterial infection.

25. The method of claim 24, wherein the bacterial infection is selected from the group consisting of: *Clostridium tetani, Clostridium perfringens, Clostridium botulinum,* other *Clostridium* species, *Pseudomonas aeruginosa,* other *Pseudomonas* species, *Campylobacter* species, *Vibrio cholerae, Ehrlichia* species, *Actinobacillus pleuropneumoniae, Pasteurella haemolytica, Pasteurella multocida,* other *Pasteurella species, Legionella pneumophila,* other *Legionella* species, *Salmonella typhi,* other *Salmonella* species, *Shigella* species *Brucella abortus,* other *Brucella* species, *Chlamydi trachomatis, Chlamydia psittaci, Coxiella burnetti, Escherichia coli, Neiserria meningitidis, Neiserria gonorrhea, Haemophilus influenzae, Haemophilus ducreyi,* other *Hemophilus species, Yersinia pestis, Yersinia enterolitica,* other *Yersinia species, Escherichia coli, E. hirae* and other *Escherichia* species, as well as other *Enterobacteriacea, Brucella abortus* and other *Brucella* species, *Burkholderia cepacia, Burkholderia pseudomallei, Francisella tularensis, Bacteroides fragilis, Fusobascterium nucleatum, Provetella* species and *Cowdria ruminantium*.

26. The method of claim 21, wherein the compound does not affect tubulin.

27. A method of inhibiting FtsZ polymerization in a bacterium comprising contacting the bacterium an effective amount of one or more compounds having the structure:



wherein

a) X_1 and X_2 are CH or N, and at least one of X_1 and X_2 are N;

b) S_1 is an organic radical comprising 1 to 8 carbon atoms;

c) S_2, S_3, and S_4 are independently selected from hydrogen, amino, halogen, or one or more organic radicals comprising 1 to 26 carbon atoms;

d) or a salt thereof.

28. The method of claim 27, wherein the bacterium is gram positive.

29. The method of claim 28, wherein the gram positive bacterium is selected from the group consisting of: : *M. tuberculosis, M. bovis, M. typhimurium, M. bovis* strain BCG, BCG substrains, *M. avium, M. intracellulare, M. africanum, M. kansasii, M. marinum, M. ulcerans, M. avium* subspecies *paratuberculosis, Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus equi, Streptococcus pyogenes, Streptococcus agalactiae, Listeria monocytogenes, Listeria ivanovii, Bacillus anthracis, B. subtilis, Nocardia asteroides*, and other *Nocardia* species, *Streptococcus viridans* group, *Peptococcus* species, *Peptostreptococcus* species, *Actinomyces israelii* and other *Actinomyces* species, and *Propionibacterium acnes*.

30. The method of claim 27, wherein the bacterium is gram negative.

31. The method of claim 30, wherein the gram negative bacterium is selected from the group consisting of: *Clostridium tetani, Clostridium perfringens,*

Clostridium botulinum, other *Clostridium* species, *Pseudomonas aeruginosa*, other *Pseudomonas* species, *Campylobacter* species, *Vibrio cholerae*, *Ehrlichia* species, *Actinobacillus pleuropneumoniae*, *Pasteurella haemolytica*, *Pasteurella multocida*, other *Pasteurella species*, *Legionella pneumophila*, other *Legionella* species, *Salmonella typhi*, other *Salmonella* species, *Shigella* species *Brucella abortus*, other *Brucella* species, *Chlamydi trachomatis*, *Chlamydia psittaci*, *Coxiella burnetti*, *Escherichia coli*, *Neiserria meningitidis*, *Neiserria gonorrhea*, *Haemophilus influenzae*, *Haemophilus ducreyi*, other *Hemophilus species*, *Yersinia pestis*, *Yersinia enterolitica*, other *Yersinia species*, *Escherichia coli*, *E. hirae* and other *Escherichia* species, as well as other *Enterobacteriacae*, *Brucella abortus* and other *Brucella* species, *Burkholderia cepacia*, *Burkholderia pseudomallei*, *Francisella tularensis*, *Bacteroides fragilis*, *Fusobascterium nucleatum*, *Provetella* species and *Cowdria ruminantium*.

32. The method of claim 27, wherein the compound is linked to a permeability enhancer, wherein the permeability enhancer allows the compound to cross the cell envelope of the bacterium.

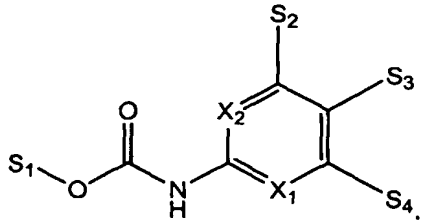
33. The method of claim 32, wherein the enhancer is selected from the group consisting of polymyxin B, surface active agents, defensins, other membrane active peptides and chelating agents.

34. The method of claim 27, further comprising contacting the bacterium with a permeability enhancer.

35. The method of claim 34, wherein the permeability enhancer is selected from the group consisting of polymyxin B, surface active agents, defensins, other membrane active peptides and chelating agents.

36. A method of inhibiting bacterial growth comprising contacting a bacterium with an effective amount of a compound having the structure 4-[(6-Amino-2,3-diphenyl-pyrido[2,3-b]pyrazin-8-ylamino)-methyl]-N,N-diethyl-benzenesulfonamide.

37. A method of treating a subject with a bacterial infection, comprising administering to the subject an effective amount of one or more compounds having the structure:



wherein

a) X_1 and X_2 are CH or N, and at least one of X_1 and X_2 are N;

b) S_1 is an organic radical comprising 1 to 8 carbon atoms;

c) S_2, S_3, and S_4 are independently selected from hydrogen, amino, halogen, or one or more organic radicals comprising 1 to 26 carbon atoms;

or a pharmaceutically acceptable salt thereof.

38. The method of claim 37, wherein the bacterial infection is a gram positive bacterial infection.

39. The method of claim 38, wherein the bacterial infection is selected from the group consisting of: : *M. tuberculosis, M. bovis, M. typhimurium, M. bovis* strain BCG, BCG substrains, *M. avium, M. intracellulare, M. africanum, M. kansasii, M. marinum, M. ulcerans, M. avium* subspecies *paratuberculosis, Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus equi, Streptococcus pyogenes, Streptococcus agalactiae, Listeria monocytogenes, Listeria ivanovii, Bacillus anthracis, B. subtilis, Nocardia asteroides*, and other *Nocardia* species, *Streptococcus viridans* group, *Peptococcus* species,

Peptostreptococcus species, *Actinomyces israelii* and other *Actinomyces* species, and *Propionibacterium acnes*.

40. The method of claim 37, wherein the bacterial infection is a gram negative bacterial infection.

41. The method of claim 40, wherein the bacterial infection is selected from the group consisting of: *Clostridium tetani, Clostridium perfringens, Clostridium botulinum*, other *Clostridium* species, *Pseudomonas aeruginosa*, other *Pseudomonas* species, *Campylobacter* species, *Vibrio cholerae, Ehrlichia* species, *Actinobacillus pleuropneumoniae, Pasteurella haemolytica, Pasteurella multocida*, other *Pasteurella species, Legionella pneumophila*, other *Legionella* species, *Salmonella typhi*, other *Salmonella* species, *Shigella* species *Brucella abortus*, other *Brucella* species, *Chlamydi trachomatis, Chlamydia psittaci, Coxiella burnetti, Escherichia coli, Neiserria meningitidis, Neiserria gonorrhea, Haemophilus influenzae, Haemophilus ducreyi*, other *Hemophilus species, Yersinia pestis, Yersinia enterolitica*, other *Yersinia species, Escherichia coli, E. hirae* and other *Escherichia* species, as well as other *Enterobacteriacae, Brucella abortus* and other *Brucella* species, *Burkholderia cepacia, Burkholderia pseudomallei, Francisella tularensis, Bacteroides fragilis; Fusobascterium nucleatum; Provetella* species and *Cowdria ruminantium*.

42. The method of claim 37, wherein the compound does not inhibit tubulin polymerization.